

The identity of *Lepidium peregrinum* (Brassicaceae), an endangered Australian plant species

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Abstract

Scarlett, N.H. (Department of Botany, La Trobe University, Bundoora, Victoria 3083, Australia) 1999. The identity of *Lepidium peregrinum* (Brassicaceae), an endangered Australian plant species. *Telopea* 8(3): 337–350. Rediscovery of the presumed extinct *Lepidium peregrinum* in northern New South Wales has allowed its morphology and diagnostic characters to be described more fully than hitherto. Its relationship to its close relatives is clarified and a key provided. Its original range, habitat, occurrence in Europe as a wool-alien and conservation status are also discussed.

Introduction

In March 1990 the author located a puzzling population of *Lepidium* on the banks of Tenterfield Creek at Clifton in northern New South Wales. The tall, bushy plants conformed closely to descriptions of the presumed extinct *Lepidium peregrinum* Thell. (Briggs & Leigh 1996), having lanceolate leaves with serrate to serrulate margins and elliptical to ovate siliculae shorter than the arcuate, abaxially vestured pedicels (Thellung 1913a, Hewson 1982a). However, the branch-subtending, mid-cauline leaves of the Clifton collections were clearly auriculate to sagittate at their bases, whereas both Thellung and Hewson described the leaves of *L. peregrinum* as attenuate-based. Furthermore, the author did not note any auriculate-based leaves when examining Thellung's type in 1987. Surprisingly, a re-examination of the type showed that the few mid-cauline leaves present certainly have auriculate-sagittate bases, somewhat obscured by pressing and drying (McKean, in litt. 1990). Further comparison of the Clifton material with the type finally confirmed the initial tentative determination and thus the distinctness of this enigmatic species. The Clifton population is the only stand of the species currently known to survive.

Remarkably, *Lepidium peregrinum* was first discovered as an adventive wool-alien in the British Isles. Dr A. Thellung described the species from a specimen collected in 1910 by Miss Ida M. Hayward at Galafoot near Galashiels, south of Edinburgh in the Scottish border country. Further details were published in *The Adventive Flora of Tweedside* (Hayward & Druce 1919): 'On overhanging bank amid native herbage and on river shingle on the Gala at its junction with the Tweed, Flowering August to September. Rare. Exhibited at the Linnean Society April 2, 1914'. It seems that the plants persisted at Galafoot for at least three years, as a note on the type sheet, presumably by Hayward, states 'Several plants flowered 1913'. The seed which produced this remarkable colony undoubtedly came from the tweed mills of Galashiels, a prolific source of adventive wool-alien in the latter half of the nineteenth century: 'At that time, fleeces were brought to the Scottish border country from all over the world; from the outback of Australia, from the pampas of Argentina, from the Cape of South Africa and from the Mediterranean coasts of North Africa. Tangled up in the wool were all manner of seeds, which, after combing and washing, found their way into the waters of the River Tweed' (Crawley 1989).

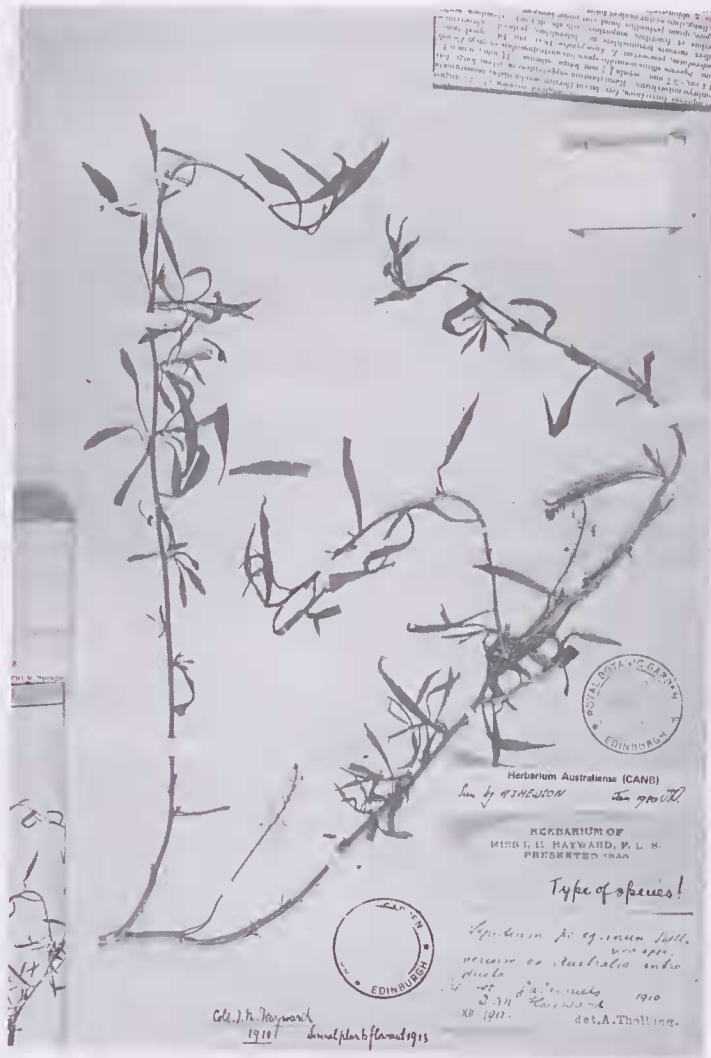


Fig. 1. Holotype of *Lepidium peregrinum*.

Thellung's choice of Australia as the ultimate origin of *L. peregrinum* (planta peregrina, verisimillime ex Australia oriunda) was based on its affinities with other Australian members of his 'grex *Pseudo-Ruderalia*' (see Hewson 1982a), particularly *L. pseudo-hyssopifolium* Hewson, which he cites as *L. hyssopifolium* Desv. emend. DC. However, Hewson (1982a) suggested that *L. peregrinum* may be an introduction to Australia. This question is discussed later in this paper.

The type of *L. peregrinum* consists of only one forked upper branch in flower and fruit, (Fig. 1) thus the morphology of rosette and lower cauline leaves was not included in Thellung's original description. Furthermore, both Thellung's and Hewson's descriptions of the species require some emendations which are discussed after the description given below. Diagnostic comments are based only on the characters available from the type collection which confirm the Clifton population as *L. peregrinum*. Table 1 gives a broader comparison of the diagnostic and sub-diagnostic characters of *L. peregrinum* and its close relatives in section *Dileptium* (Raf.) DC.

Table 1. Diagnostic and sub-diagnostic characters of *Lepidium peregrinum* and closely related species.

Character	<i>L. peregrinum</i>	<i>L. pseudotasmanicum</i>	<i>L. pseudohyosyopifolium</i>	<i>L. africanum</i>	<i>L. hyosyopifolium</i>	<i>L. desvauxii</i>
Rosette and lower cauline leaf shape	Lyrate-pinnatifid, distal margins of the lobes serrate	Pinnatifid, distal margins of the lobes dentate, often deeply so	Lyrate-pinnatifid to pinnatifid, distal margins of the lobes serrate or dentate	Simple, rarely pinnatifid, leaf margins serrate	Pinnatifid, distal margins of the lobes dentate	Lyrate-pinnatifid, distal margins of the lobes serrate to crenulate
Marginal hairs of lower cauline leaves	Long-acicular	Short-acicular to peg-like	Acicular, of variable length	Long-acicular	Short-acicular, often twinned	Short-acicular, often twinned
Mid-cauline leaf shape	Lanceolate, margins serrate to serrulate	Oblanceolate to cuneate, margins dentate	Lanceolate to oblanceolate, margins serrate to dentate	Lanceolate, margins serrate to serrulate	Lanceolate to oblanceolate, margins dentate	Oblanceolate to cuneate, margins serrate to dentate
Leaf base of branch-subtending cauline leaves at the point of insertion	Auriculate-sagittate	Auriculate-sagittate to attenuate	Attenuate, very rarely slightly flared at the point of attachment	Always attenuate	Auriculate-sagittate	Auriculate-sagittate
Posture of pedicels with mature siliculae	Arcuate to recurved	Erecto-patent to recurved	Erecto-patent to recurved	Strongly arcuate	Recurved	Erecto-patent to recurved
Pedicel vestiture	Adaxial	Adaxial	Absent, rarely with sparse adaxial hairs	Adaxial	Always circumferential	Circumferential to adaxial
Mature silicula shape	Elliptic to ovate	Ovate to rhomboid	Elliptic, ovate to rhomboid	Obovate to elliptic	Ovate to rhomboid	Ovate

Taxonomy

Lepidium peregrinum Thell. in Druce, *Bot. Exch. Club Br. Isl. Rep.* 1912 3(3):153, t.9 (1913), *Feddes Repert.* 13:79 (1913); Hayward & Druce, *Advent. Fl. Tweedside* 32, t.9 (1919); (e descriptione) Schultz in Ascherson & Graebner, *Syn. mitteleur. Fl.* 5(4): 223 (1938).

Type: Scotland: Galafoot, Galashiels, *I.M. Hayward s.n.*, 1910 (holo E!) Fig. 1.

Lepidium hyssopifolium auct. non Desv. (1814), Schultz in Ascherson & Graebner, *Syn. mitteleur. Fl.* 5(4): 223 (1938).

Perennial herb to sub-shrub, usually 10–80 cm tall, sometimes ascending to 2 m in surrounding vegetation. Stems erect to decumbent, slightly angular and ridged, glabrous or rarely sparsely vested with blunt peg-like hairs. Rosette and lower cauline leaves variably petiolate, the lamina pinnatifid with a large broad-lanceolate terminal lobe, vested with long-acicular hairs on the upper surface and margins, the distal margins serrate (60–100 mm long, 15–25 mm wide). Mid-cauline leaves lanceolate and broadly petiolate, the serrate to serrulate margins with numerous tooth-like hairs; branch-subtending leaves with auriculate to sagittate bases at the point of leaf insertion (Fig. 2), sessile to subsessile (40–90 mm long, 4–9 mm wide).



Fig. 2. Mid-cauline leaf of *Lepidium peregrinum* showing auriculate/sagittate base ($\times 12$) (from Holotype).

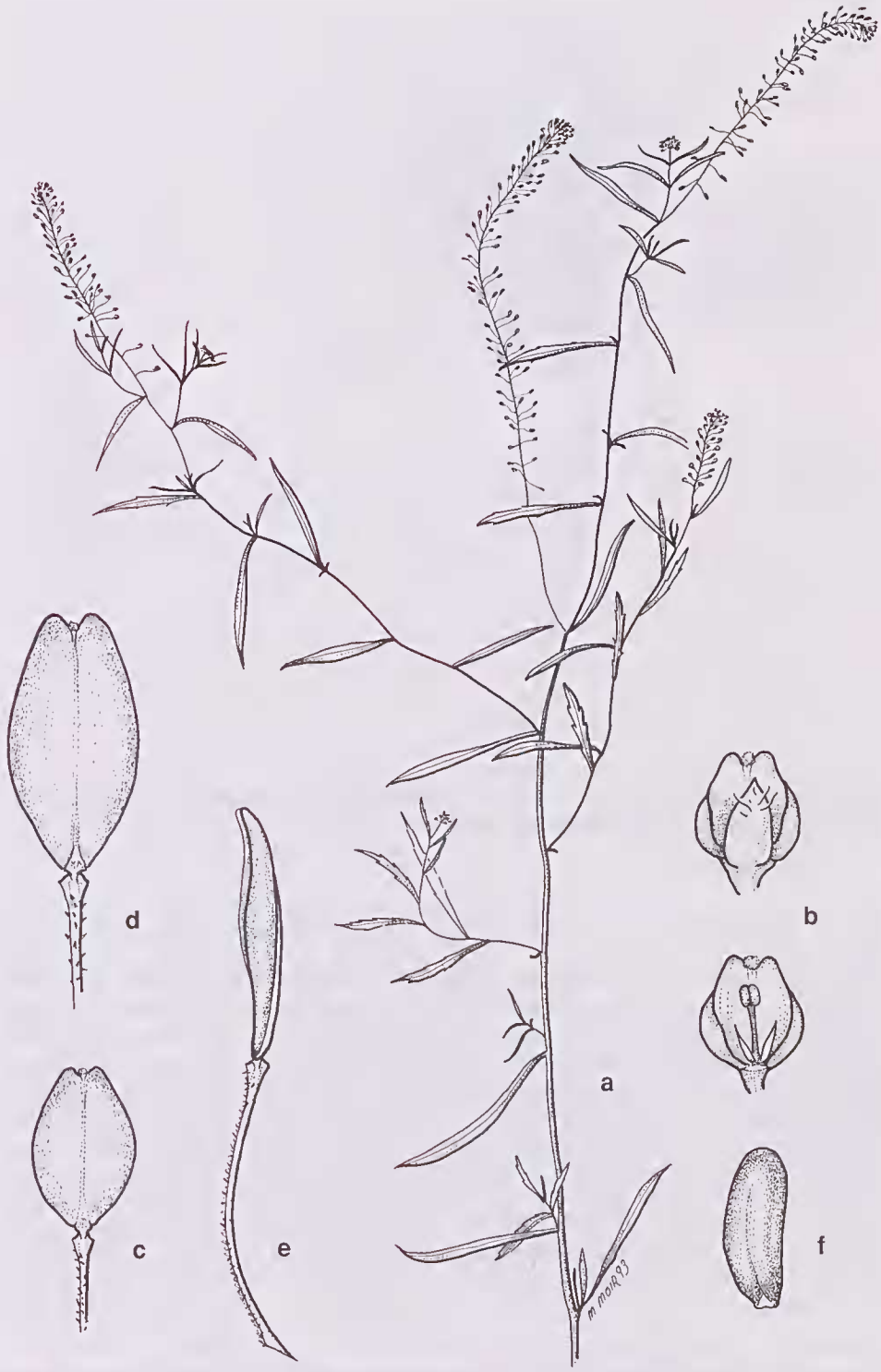


Fig. 3. *Lepidium peregrinum*. a, upper branch ($\times 0.5$); b, adaxial detail of late mature flowers, adaxial sepal removed in lower flower ($\times 15$); c, adaxial view of immature fruit ($\times 10$); d, adaxial view of mature fruit ($\times 10$); e, lateral view of mature fruit ($\times 10$); f, seed ($\times 15$) (from Scarlett 90-59).



Fig. 4. *Lepidium peregrinum*. a, early caulescent seedling, showing rosette ($\times 0.5$); b, rosette leaf ($\times 0.5$) (from cultivated material from the Clifton population).

Upper cauline leaves narrow-lanceolate to linear, often with entire margins with sparse tooth-like hairs, the bases usually attenuate at the point of leaf insertion (10–20 mm long, 1–1.5 mm wide). Inflorescences initially corymbose, elongating during flowering to a maximum of 20 cm. Branch-terminal racemes often appearing lateral and leaf-opposed, overtopped by a subtending axillary flowering branch. Rhachis glabrous to minutely puberulent towards the apex, slightly angular and ridged. Flowers minute; sepals 0.5–0.75 mm long, the adaxial sepal dorsally villous in the upper half, the abaxial sepal glabrous or with 1 or 2 hairs, the lateral pair of sepals always glabrous. Petals reduced to absent. Stamens 2, median. Pedicels 3–5 mm long at maturity, erecto-patent to sub-declinate and usually arcuate at fruiting, slender and sub-terete with a slightly flattened puberulent adaxial surface, 1.3 to 2 times as long as the silicula. Siliculae ovate to elliptical 2.0–3.0 mm long, 1.5–2.0 mm wide, acutely emarginate with triangular wings forming a V-shaped notch. Styles short, included in the notch. Valves green or purple, glabrous. Seeds narrowly ovoid, 1.25–1.5 mm long, 0.5–0.75 mm wide, wingless. Cotyledons incumbent. Flowering from January to April on current data. (Fig. 3, 4).

L. peregrinum is distinguished from *L. pseudohyssopifolium* Hewson by the adaxially puberulent pedicels and the sagittate-auriculate bases of branch-subtending mid-cauline leaves at the point of insertion (Fig. 2). It differs from *L. pseudotasmanicum* Thell. in the serrate-margined lanceolate mid-cauline leaves, those of the latter species

being acutely pinnatifid to entire and dentate-margined, oblanceolate to cuneate. *L. africanum* (Burm. f.) DC., which has serrate-margined mid-cauline leaves similar to *L. peregrinum*, differs in that all leaves are attenuate-based at the point of insertion.

Specimens examined: Queensland: Darling Downs: Bunya Mtns, *Willis s.n.*, June 1961 (MEL 73813). Moreton: Logan River/Tamborine Mtns, *Scortechini 412*, 1883 (MEL 73790).

New South Wales: Northern Tablelands: near Maryland at the border of NSW and Qld., *Hickey 40*, Nov 1884 (MEL 73813). North Western Slopes: south bank of Tenterfield Creek, about 1 km south of Clifton, and 0.4 km by road north of the Gibraltar Road/Bruxner Hwy Junction, 29°02'50"S 151°44'00"E, *Scarlett 90-51, 90-52*, 14 Mar 1990 (CANB 405203, 405201). Seven further field collections from the same locality and cultivated material grown from the field collections also examined (all held at LTB, duplicates to be distributed to BRI, MEL and NSW).

Switzerland: Derendingen, Kompost der Kammgarnfabr., *Probst s.n.*, 23 Oct 1910 (L 924355832).

Notes

1. **Leaf form.** Seedlings grown from the Clifton population have pinnatifid rosette and lower cauline leaves with a large, broad-lanceolate terminal lobe, similar to those of *L. desvauxii* and certain populations of *L. pseudohyssopifolium*. This leaf form is usually termed lyrate-pinnatifid. Cauline leaves of the species vary from lower leaves resembling the rosette leaves to very small linear upper leaves with entire margins. The reduction in complexity of leaf form toward the stem apex is gradual, and the division into lower, middle and upper cauline leaves used in the description is indicative only. In general, plants growing in moist conditions develop leaves of more complex form higher on the stems, while plants growing in dry conditions may have less divided lower cauline leaves. As mentioned in the introduction, the bases of branch-subtending mid-cauline leaves are auriculate to sagittate, a feature of the species previously overlooked (see Fig. 2). Such bases are not entirely confined to the branch-subtending leaves, and may occur elsewhere on the stems. However, the branch-subtending leaves are the best reference point when determining specimens. This feature is difficult to detect because although the leaves are 'attenuate', in that they narrow to a winged petiole, there is a pair of pointed auricles directed toward and often around the stem at the point of leaf attachment, sometimes with an extremely short stalk adaxially between the auricles and the stem. The auricles can be quite small and are often withered and shrunken in dried material.

Some populations of *L. pseudotasmanicum* also have auriculate leaves, a character not previously noted for the species (Hewson 1982a, Retter & Harden 1990, Entwisle 1996). In the case of *L. pseudohyssopifolium*, an occasional branch-subtending mid-cauline leaf may have a slightly flared base at the point of insertion, but auriculate-sagittate bases are entirely absent. Descriptions of *Lepidium* leaves do not always clearly distinguish between the mode of leaf attachment as petiolate, attenuate or sessile and the shape of the leaf base at or close to the point of insertion, which may be attenuate, auriculate or sagittate. Thellung (1906) is clear on this point in some cases, as in his description of the South American *L. densiflorum* Schrad. '... quasi in petiolum attenuata (petiola insertione saepe leviter dilatata et semiamplexicaule, sed nunquam auriculato) ...'. In other cases his description is difficult to interpret, as in that for *L. peregrinum*: 'Folia caulina lanceolata, utrinque attenuato-acuta', there being no clear reference to the point of leaf insertion.

More recent workers, e.g. Hewson (1982a), when describing leaves as 'attenuate based' seem to imply, but do not actually state, that the leaves are also attenuate at the point of insertion. In some cases, such as *L. peregrinum*, this is not so.

2. **Inflorescences.** Thellung describes the racemes of *L. peregrinum* as lateral and leaf-opposed (in ramis laterales, folio oppositi, ...). In fact, the species has branch-terminal

corymbose racemes, as in all other members of the genus (Hewson 1982b, Al-Shehbaz 1986). However, branch-terminal racemes are frequently rapidly over-topped by a leafy, potentially inflorescence-bearing branch, initiated in the axil of the subtending leaf. The primary branch-terminal raceme may finally appear to be lateral and leaf-opposed due to the further growth of this subtending branch. Further raceme-terminated leafy branches may also be initiated basipetally in the axils of leaves below the primary raceme-subtending leaf. While the development of apparently lateral inflorescences seems to be a constant character in *L. peregrinum*, it is also found in *L. pseudohyssopifolium*, *L. pseudotasmanicum* and *L. hyssopifolium*, particularly in plants growing in partial shade. It is not a diagnostic character of *L. peregrinum*. It is interesting to note that Thellung (1919) suggested that the type of *L. peregrinum* may have been a 'shade form' (forma umbrosa).

3. Siliculae. Thellung describes the siliculae as ovate with the dimensions '2 × 1½ mm', whereas elliptical siliculae 3 mm in length are predominant in the Clifton collections (see Fig. 3). However, ovate siliculae only 2.5 mm long occur on shaded plants from the Clifton population. Mature siliculae are definitely acutely emarginate, the acutely triangular wings forming a V-shaped notch, thus according with Thellung's original description, although his statement that the apices of the wings are porrect applies only to dried, somewhat immature siliculae. In this respect the descriptions and illustrations of the siliculae of *L. peregrinum* in Hewson (1982a) and Retter and Harden (1990) are rather misleading. In fact the siliculae of *L. peregrinum* differ little from those of *L. pseudohyssopifolium*.

As pointed out by Ryves (1977), the full range of silicula size and shape is usually wider than that given in species' descriptions. Although measurements of siliculae should be made at the middle of a fruiting raceme (Garnock-Jones 1988), this rule is not always observed, introducing a further source of descriptive variation.

Key to the section *Dileptium* (Rafin.) DC. in Australia, modified from Hewson (1982a)

- 1† Plants with all leaves divided (at least pinnatifid)
 - 2 Nectariferous glands insignificant, at the base of the petals, shield-shaped *L. bonariense*
 - 2* Nectariferous glands conspicuous, as long as the petals *L. pubescens*
- 1* Plants with at least the upper stem leaves simple
 - 3 Petals longer than the sepals *L. virginicum*
 - 3* Petals shorter than the sepals or absent
 - 4 Cauline leaves all or in part auriculate- to sagittate-based at the point of insertion
 - 5 Pedicels glabrous
 - 6 Inflorescence a corymb, not elongating into a raceme *L. fasciculatum*
 - 6* Inflorescence finally an elongate raceme
 - 7 Petals rudimentary, broad; silicula more than 3 mm long *L. hypenation*
 - 7* Petals rudimentary, narrow; silicula less than 3 mm long *L. sagittulatum*††

† This key begins at 22* of the key in Hewson (1982a).

†† *L. species B sensu* Retter and Harden (1990) would key out here.

- 5* Pedicels hairy
- 8 Inflorescence axis terminating in a sharp spine *L. aschersonii*
- 8* Inflorescence axis not terminating in a sharp spine
- 9 Pedicels hairy over the whole surface
- 10 Stems downy with dense fine patent acicular hairs; rosette and lower cauline leaves pinnatifid; cauline leaves glabrous on the upper surface *L. hyssopifolium*
- 10* Stems scabrous with dense, reflexed acicular hairs; rosette leaves lyrate-pinnatifid with a large, broad terminal lobe; cauline leaves scabrous to pubescent on the upper surface *L. desvauxii*
- 9* Pedicels hairy only on the adaxial surface
- 11 Mid-cauline leaves lanceolate with serrate/serrulate margins; rosette and lower cauline leaves lyrate-pinnatifid with a large broad terminal lobe. *L. peregrinum*
- 11* Mid-cauline leaves oblanceolate to cuneate, the margins dentate with acute, \pm patent lobes, often with only a single pair below the apex; rosette and lower cauline leaves not lyrate-pinnatifid
..... *L. pseudotasmanicum*
- 4* All cauline leaves attenuate-based at the point of insertion
- 12 Pedicels glabrous, very rarely with scattered hairs
- 13 Mid-cauline leaves lanceolate, reducing to linear, sometimes serrate or toothed *L. pseudohyssopifolium*
- 13* Mid-cauline leaves narrow obovate to spatulate, toothed or crenate at the apex *L. flexicaule*
- 12* Pedicels densely hairy
- 14 Silicula 4–6 mm long *L. muelleriferdinandi*[†]
- 14* Silicula less than 4 mm long
- 15 Stigma markedly capitate, exserted from the silicula notch
..... *L. puberulum*
- 15* Stigma not markedly capitate, included in the silicula notch
- 16 Mid-cauline leaves lanceolate with serrate/serrulate margins; pedicels arcuate; silicula ovate to obovate; rosette and lower cauline leaves simple, very rarely pinnatifid, serrate-margined *L. africanum*
- 16* Mid-cauline leaves oblanceolate to cuneate with dentate margins, often with only a single pair of lobes below the apex; pedicels erecto-patent; silicula elliptical; rosette and lower cauline leaves pinnatifid to lobed or dentate.
- 17 Silicula 2–2.25 mm long; pedicels with fine patent hairs \pm equal to the diameter of the pedicel; annual or ephemeral herb to 30 cm tall *L. pseudoruderale*
- 17* Silicula 2.5–3.0 mm long; pedicels with hairs shorter than the diameter of the pedicel; perennial herb to 60 cm tall
..... *L. pseudotasmanicum*

[†] *L. ambiguum* F. Muell. would key out here, see Hewson (1982a) p. 290.

Notes on determination of *Dileptium* specimens. *L. peregrinum* has a unique combination of characters when compared to closely related species of the section *Dileptium* (see Table 1). While some of the characters cited by Thellung as distinguishing it from *L. pseudohyssopifolium* Hewson [= Thellung's *L. hyssopifolium* Desv. emend. DC.] and *L. africanum* (Burm. f.) DC. [= Thellung's *L. divaricatum* Soland. subsp. *linoides* (Thunb.) Thell.] cannot be upheld, the more complete material from the Clifton population has strengthened the distinctions between these species. If a wider range of material had been available to Thellung, it is unlikely that he would have mistakenly described a specimen of *L. pseudohyssopifolium* Hewson collected by Hayward at Galashiels in 1918 as a variety of *L. peregrinum* (*L. peregrinum* var. *glabripes* Thell.). He was apparently misled by the small siliculae (2 mm long, 1.75 mm wide) and the 'lateral' inflorescences, discounting the glabrous pedicels which are characteristic of *L. pseudohyssopifolium* (Thellung 1919).

Collections of *L. peregrinum*, *L. pseudotasmanicum* and *L. africanum* which lack rosettes and lower to mid-cauline leaves are difficult to separate, even if they are fertile. Collections lacking rosette and lower cauline leaves from those populations of *L. pseudotasmanicum* which have auriculate-sagittate based mid-cauline branch-subtending leaves are particularly difficult to separate from *L. peregrinum*. The author has found that silicula size and shape are too unreliable in these cases. However, the lanceolate mid-cauline leaves of *L. peregrinum* are variably serrate, broadest in the middle and evenly tapering to both ends, while those of *L. pseudotasmanicum* are toothed with markedly outwardly curving, sometimes almost patent acute lobes, and are *broadest in the upper quarter*, tapering gradually to the base (Fig. 5). Some leaves may be almost cuneate with the ultimate pair of teeth and the acute apex creating a trifold appearance.

Specimens of either species which have only rather reduced mid-cauline leaves can usually be separated by the rule that in *L. peregrinum* the length of the teeth of the leaf margins is always less than half of the lamina width at the point of attachment of the tooth, whereas in *L. pseudotasmanicum* there is at least one pair of teeth which is longer than half of the lamina width, although some may be shorter. Occasionally, mid-cauline leaves of *L. peregrinum* have two to three reduced leaf-lobes at the base of the main lamina which are longer than half the lamina width at that point. These lobes could lead to misdetermination if they are not distinguished from the smaller teeth of the lamina margins. In *L. pseudotasmanicum*, the mid-cauline leaves are toothed in the upper (distal) part of the lamina. Specimens of either species having only very reduced upper-cauline leaves with entire margins cannot be distinguished. In the case of *L. africanum*, fertile specimens with reduced upper-cauline leaves can often be distinguished from *L. peregrinum* by the obovate siliculae and more arcuate pedicels which are equal to or slightly longer than the silicula (c. 2–3 mm). However these characters are not completely reliable.

Records of *L. peregrinum*. Although *L. peregrinum* was never collected again in Scotland or elsewhere in Great Britain (Ryves 1977), Probst (1928) recorded it as a wool-alien in Switzerland: 'Derend. K.K. 27.', that is 'Derendingen near Solothurn, wool-compost at the worsted mill, 1927.' However, this record must be treated with caution, since the brief description based on this specimen in Schultz (1938) could equally apply to *L. pseudotasmanicum*. Nevertheless, *L. peregrinum* certainly did appear as a wool-alien in Switzerland. A Probst collection in Leiden (L 924355832) labelled 'Derendingen, Kompost der Kammgarnfabr. 23.10.10 (Austr. Wolle)' is definitely this species, though determined, presumably by Thellung, as *L. hyssopifolium* Desv. Schultz's (1938) description of *L. hyssopifolium* Desv. is derived from this material. Most importantly, the wool from which the specimen grew was definitely of Australian origin (see also Probst 1914: 159).

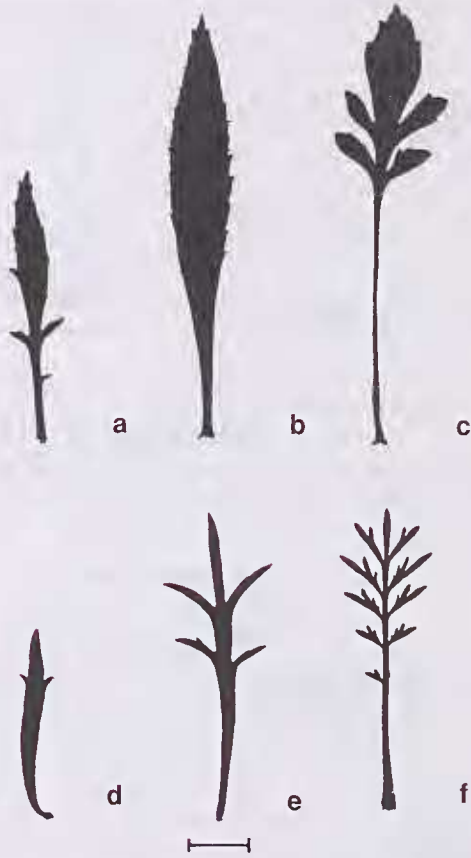


Fig. 5. a–c *Lepidium peregrinum*. a, mid-cauline leaf showing lobing at the base of the lamina; b, unlobed mid-cauline leaf; c, lower cauline leaf; d–f, *Lepidium pseudotasmanicum*. d, mid-cauline leaf with reduced teeth; e, ‘tridentate’ mid-cauline leaf; f, lower cauline leaf. (a from Scarlett 90-54, b, c from cultivated material from the Clifton population, d–f from Scarlett 84-714). Scale bar = 10 mm.

Hewson (1982a) lists two undoubted Australian collections of the species: *Hickey 40*, near Maryland at the border of NSW and Qld, Nov 1884 (MEL 74171) and *Huegel s.n.*, Australasia, Montes Corulei [sic], without date (?1834) (W). Although both of these predate the European collections, Hewson (1982a) speculates that the species may be an introduction to Australia, perhaps from South America: ‘The assumption that it is an Australian endemic and not a more recent introduction is based on a Bauer collection, *F. Bauer s.n.*, Nova Hollandia, without date (?1802) (W). Unfortunately the specimen is juvenile and even generic identification is open to question. Besides, scarcity of collections of a species reported as a robust inhabitant of grazing country leads one to doubt that it is an Australian endemic.’ While the possibility of introduction can never be entirely discounted, Thellung, who had an excellent knowledge of South American *Lepidium* species, was certain of its Australian taxonomic affinities. While *L. peregrinum* will key out to the South American *L. aletes* Macbr. in Hitchcock’s monograph (1945), this species differs from *L. peregrinum* in having circumferentially hairy pedicels shorter than the siliculae.

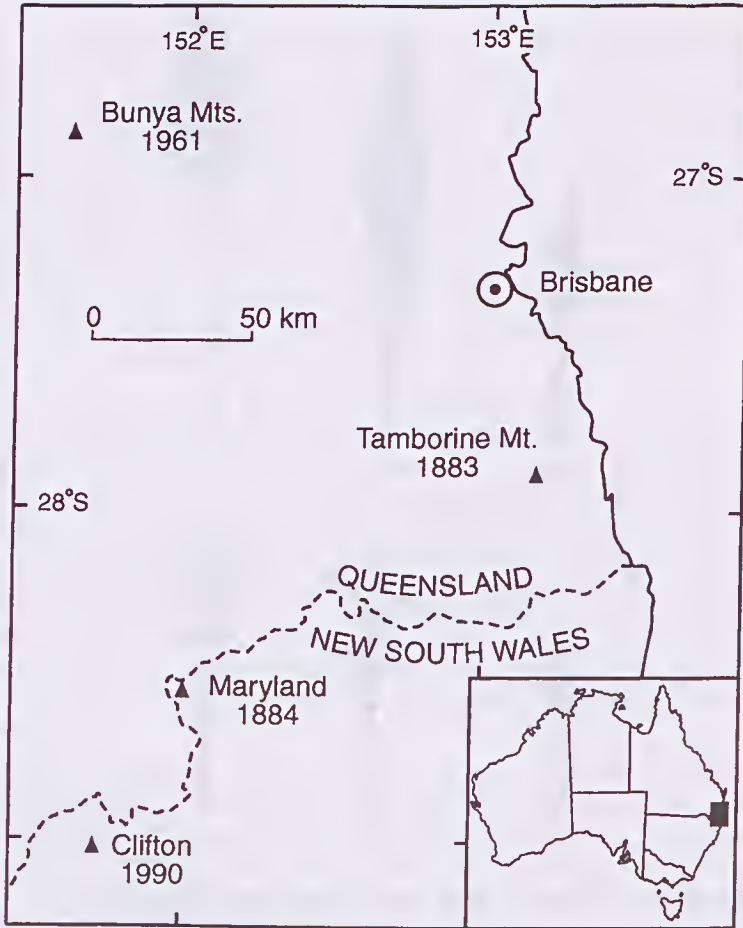


Fig. 6. Distribution of *Lepidium peregrinum* showing year of collection. An old record from the Blue Mountains of New South Wales but without precise locality is not shown.

Accepting *L. peregrinum* as an Australian endemic, it is one of seven Australian *Lepidium* species which have appeared as wool-aliens in Europe: *L. fasciculatum* Thell., *L. moupliocoides* F. Muell., *L. oxytrichum* Sprague, *L. papillosum* F. Muell., *L. pseudohyssopifolium* Hewson, *L. sagittulatum* Thell. and, rather dubiously, *L. desvauxii* Thell. (Ryves 1977, Clement 1981, Hewson 1982a). The record for *L. pseudoruderale* Thell. in Ryves (1977) applies to some other species, judging by the characters given in the key. *L. pseudohyssopifolium* and *L. moupliocoides* are both rare species in Australia, indeed *L. moupliocoides* is endangered, yet both have been transported to Europe in wool. Even more remarkably, *L. moupliocoides* was collected on river shingle at Galashiels (Ryves 1977: leg. O.M. Stewart, Sep 1977), a repeat of the equally unlikely appearance of *L. peregrinum* 67 years earlier!

On current data, *L. peregrinum* occurs only at Clifton in northern New South Wales. Two further collections of the species from Queensland were located in MEL, previously determined as *L. pseudotasuanicum*: Bunya Mtns, Willis s.u., Jun 1961 (MEL 73813) and Logan River/Tamborine Mountains, *Scortechini* 412, 1883 (MEL 73790) (Fig. 6). While the relatively recent Willis collection suggests it may persist in southern

Queensland, the author failed to locate further stands of the species between Clifton and Maryland in the New South Wales–Queensland border areas in 1990. On the southern Darling Downs in Queensland only *L. pseudohyssopifolium* and the weedy *L. africanum* and *L. bonariense* were found. Recent vegetation surveys of the New England Tablelands (McIntyre *et al.* 1993) and the Darling Downs and Bunya Mountains (Fensham 1998 and pers. comm.; Fensham and Fairfax 1996) have found only *L. pseudotasmanicum*, *L. bonariense* and *L. africanum*. The Bunya Mountains site was searched in November 1998, but the species was not found (R. Fensham, pers. comm.). The northwest Victorian *Lepidium* collections regarded by Scarlett and Parsons (1989) as possibly forms of *L. peregrinum* are from the rare populations of *L. pseudohyssopifolium* which have sparse hairs on the pedicels, differing diagnostically from *L. peregrinum* in the absence of auriculate-sagittate leaf bases.

While further field searches are necessary, *L. peregrinum* is currently an endangered species, facing similar threats to the other threatened *Lepidium* species of grazing country: *L. aschersonii* (V), *L. hyssopifolium* (E), *L. monoplocoides* (E) and *L. pseudopapillosum* (V). The correct conservation code for the species is 3E qN 46x, 47x, 50, 57x using the system of Briggs and Leigh (1996). Briggs and Leigh and ANZECC (1998) code it as X (extinct). The Clifton population (< 100 plants) grows on unreserved Crown Land.

Habitat

At Clifton, *L. peregrinum* grows in riparian open forest dominated by *Eucalyptus camaldulensis* and *Casuarina cunninghamiana* with a variably dense shrubby understorey of *Hymenanthera dentata*, *Bursaria spinosa*, *Acacia finbriata*, *Acacia floribunda*, *Callistemon viminalis* and *Leptospermum brachyandrum*. *L. peregrinum* was most abundant in the tussock grassland fringe of the riparian open forest (*Poa* sp. – *Lomandra longifolia* – *Paspalum dilatatum*), with some plants scrambling to a height of 2 m in thickets of *Hymenanthera*. It also occurred in shade under shrubs close to the creek bank, where most plants were small, c. 30 cm in height.

Sandy alluvium is the major soil type, with outcropping and water-transported rocks and boulders in the shallow braided channels fringing the creek. Sixty-six plants were counted within an area of about 1 ha. While there are no habitat notes for the Maryland collection, a riparian habitat is most likely. At the Bunya Mountains locality, J.H. Willis' note 'in rainforest/roadside near Mowbullun guesthouse ± 3400 ft' suggests colonisation of man-made excavations and vine forest regrowth on rich volcanic soil. The 'Tamborine Mtns' collection is likely to have come from a similar site.

In terms of its recorded range, *L. peregrinum* is a species of upland areas between about 700 and 1000 m in altitude with a rainfall range of approximately 800 to 1000 mm per annum. In the lower altitude, drier part of its historic range it may be confined to riparian sites. Its occurrence in a humid to sub-humid climatic zone with uniform or summer maximum rainfall incidence is unusual for an indigenous Australian *Lepidium* species.

Acknowledgments

I thank the director of MEL for providing access to the collections there, and the directors of L, E and BRI for the loan of specimens. I am also grateful to Dr D.R. McKean (E) for checking the leaf characters of the type of *L. peregrinum*. Thanks are also due to Howard Browne and Bill Archer for donations of *Lepidium* specimens

relevant to the *L. peregrinum* problem, Mali Moir for her drawings, Trevor Phillips for photographing the type sheet, Max Bartley for assistance with the figures, and Mara Walsh for typing a difficult manuscript. Dr R.F. Parsons, Mr N. Walsh and Dr H. Hewson provided valuable advice.

The field work during which *L. peregrinum* was collected was funded by the World Wide Fund for Nature (Australia).

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